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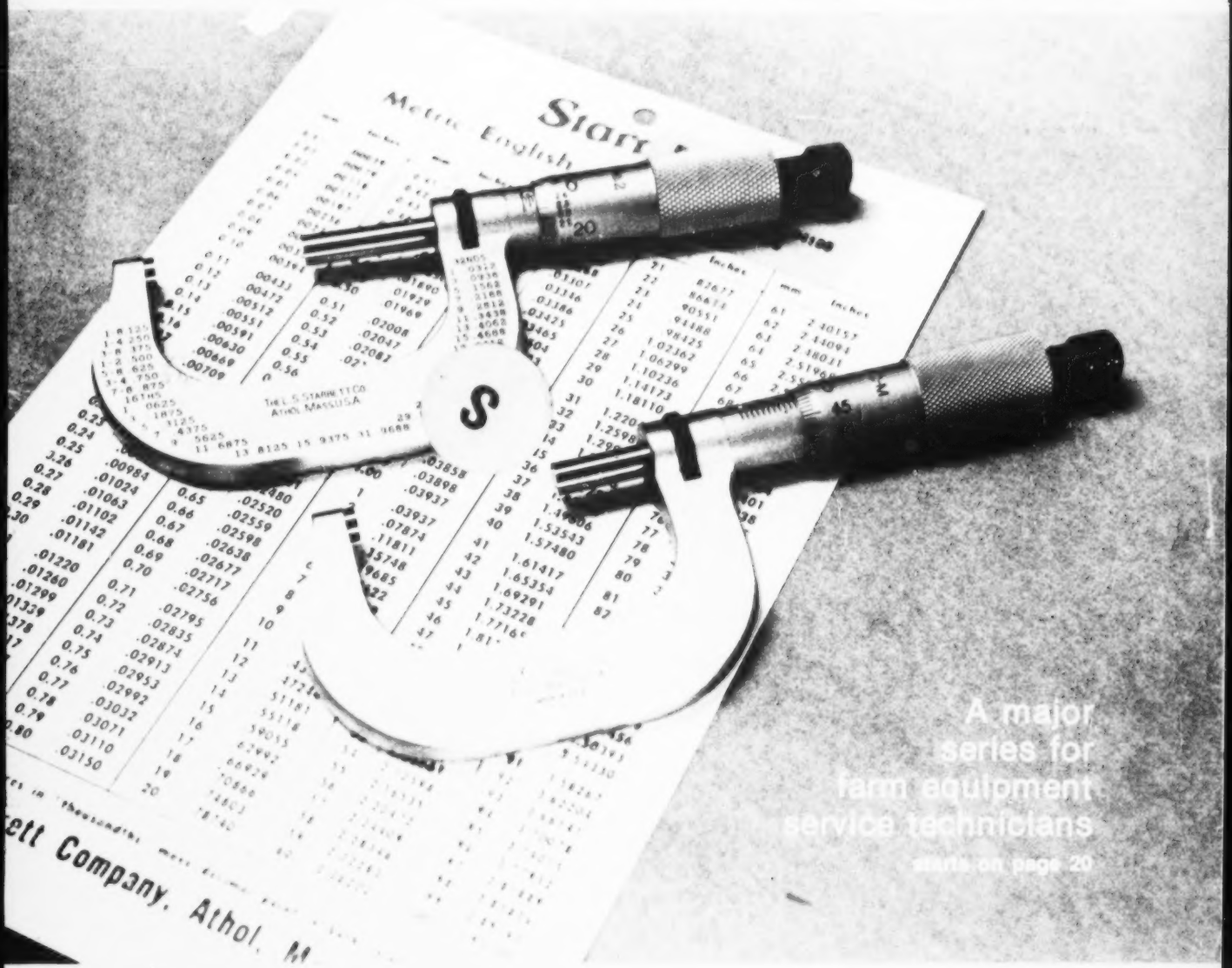

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Engine Air Intake Systems page 8

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October 21, 1979 • Vol. 94 • No. 21

Implement & Tractor

The Business Magazine of the Farm and Industrial Equipment Industry

in this issue...

8: The Air-Induction System. The modern air-cleaner is one big reason why modern engines are so much better than those of old; but they're not trouble-free. Herein, what the serviceman needs to know about air-cleaner design and function.

14: Ag Mechanization: Shortage of Workers, Questions About Wages. With an existing shortage of persons trained in ag mechanization, the outlook for the future is grimmer yet. Tech school enrollment is down, and farm equipment dealers are facing tough competition for young talent from higher-paying auto dealers.

20: Facing Up to a Metric World. Metrication is on its way, and for the serviceman who cares about his reputation, it's high time to get ready to deal with the new system. First of four articles.

26: Farmers Rate Big-Tractor Fuel Economy. Surveyed by the Professional Farmers of America, many big-tractor owners expressed satisfaction with, or apathy about, their machine's fuel economy. But do they really have any idea of what kind of fuel efficiency they can reasonably expect?

38: Service Salaries, Rates Well Up Among Far West Dealers. Reporting on the Far West Equipment Dealers Assn.'s 1979 Wage and Salary Survey, with a focus on the shop.

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RETAIL SALES OF WHEEL TRACTORS*

(In Units)

	Total Wheel Tractors†				Cumulative for Jan.-July, 1978				Cumulative for Jan.-July, 1979			
	July 1978		July 1979		Farm Type				Farm Type			
	Farm	Non-Farm	Farm	Non-Farm	2-Wheel Drive	4-Wheel Drive	Total Farm	Non-Farm	2-Wheel Drive	4-Wheel Drive	Total Farm	Non-Farm
Alabama	181	76	154	45	1,904	39	1,943	551	1,825	29	1,854	403
Arizona	51	52	53	60	466	38	504	375	415	55	470	403
Arkansas	249	74	276	46	2,376	196	2,572	595	2,408	154	2,562	429
California	369	253	373	270	2,520	157	2,677	2,185	2,795	195	2,990	2,267
Colorado	78	71	77	50	573	59	632	469	636	109	745	421
Connecticut	7	65	12	18	108	3	111	218	124	.....	124	167
Delaware	19	13	23	7	117	9	126	55	157	11	168	36
Florida	190	129	166	81	1,275	38	1,313	952	1,281	42	1,323	1,086
Georgia	227	59	190	72	2,730	38	2,768	548	2,565	27	2,592	567
Idaho	79	23	78	18	676	75	751	174	635	95	730	122
Illinois	379	178	278	107	4,867	441	5,308	1,240	4,336	461	4,797	1,059
Indiana	285	113	186	80	3,270	268	3,538	843	2,730	283	3,013	598
Iowa	389	42	405	36	5,338	253	5,591	334	5,845	366	6,211	293
Kansas	332	28	377	51	2,207	280	2,487	256	2,436	385	2,821	236
Kentucky	362	100	273	70	3,270	63	3,333	659	3,050	56	3,106	523
Louisiana	169	90	178	66	1,602	137	1,739	767	1,598	101	1,699	564
Maine	31	11	19	16	145	.....	145	85	135	1	136	94
Maryland	52	81	53	41	499	16	515	404	537	23	560	325
Massachusetts	13	45	11	26	84	.....	84	281	96	.....	96	208
Michigan	242	106	154	107	2,020	154	2,174	876	1,811	152	1,963	888
Minnesota	365	37	343	52	3,674	290	3,964	383	3,925	565	4,490	473
Mississippi	229	42	221	32	2,285	117	2,402	530	2,270	83	2,353	429
Missouri	357	89	301	88	3,107	148	3,255	683	3,464	160	3,624	608
Montana	142	8	123	10	474	221	695	140	595	294	889	121
Nebraska	164	41	207	40	2,518	141	2,659	188	2,947	197	3,144	179
Nevada	5	13	9	11	54	.....	54	140	87	3	90	121
New Hampshire	14	11	16	5	89	.....	89	96	82	1	83	73
New Jersey	27	59	15	52	240	5	245	435	209	5	214	438
New Mexico	29	37	40	25	278	14	292	254	301	19	320	182
New York	193	114	193	86	1,672	53	1,725	950	1,627	68	1,695	728
North Carolina	239	79	208	56	2,773	35	2,808	698	2,712	48	2,760	632
North Dakota	221	18	202	17	1,544	489	2,033	172	1,614	784	2,398	150
Ohio	373	166	233	105	3,662	208	3,870	1,279	2,909	220	3,129	1,094
Oklahoma	329	79	480	65	1,813	132	1,945	548	2,073	263	2,336	451
Oregon	113	55	128	46	813	41	854	345	751	40	791	354
Pennsylvania	189	171	173	97	1,759	21	1,780	1,203	1,526	27	1,553	903
Rhode Island	.....	8	3	.....	13	.....	13	36	15	.....	15	27
South Carolina	101	50	120	24	1,246	17	1,263	368	1,273	24	1,297	301
South Dakota	199	13	140	18	1,501	145	1,646	126	1,548	207	1,755	132
Tennessee	301	89	258	79	3,063	57	3,120	691	2,760	48	2,808	606
Texas	779	322	895	343	5,154	202	5,356	2,745	5,980	309	6,289	2,542
Utah	83	34	67	39	387	10	397	287	410	10	420	283
Vermont	31	11	26	7	216	1	217	45	227	5	232	49
Virginia	171	83	176	48	1,519	9	1,528	642	1,611	7	1,618	468
Washington	153	95	142	62	905	101	1,006	605	1,004	117	1,121	556
West Virgina	62	30	56	16	377	.....	377	226	376	.....	376	145
Wisconsin	315	54	298	51	3,353	86	3,439	493	3,817	135	3,952	493
Wyoming	36	18	43	24	228	13	241	124	273	23	296	157
Alaska	1	2	1	2	14	....	14	29	9	....	9	25
Hawaii	21	4	7	9	51	3	54	39	36	4	40	61
U.S. Government	9	60	10	11	41	3	44	563	59	.....	59	460
Miscellaneous‡	.....	319	1	134	61	2	63	1,060	43	3	46	918
TOTAL	**8,955**	**3,820**	**8,471**	**2,921**	**80,931**	**4,828**	**85,759**	**27,970**	**81,948**	**6,214**	**88,162**	**24,849**

Data released September 1, 1979, Farm & Industrial Equipment Institute.

*Figures do not include garden tractors, motor tillers or contractors off-highway types. Report includes units marketed by these firms: Allied Farm Equip. (Leyland Satoh); Allis-Chalmers; Belarus; J I Case; Deere; Deutz; Ford; Hy-Dynamics; International Harvester; JCB Excavators; K-D Mfg.; Long; Massey-Ferguson; Pettibone; R. M. Wade (Satoh); Steiger; Versatile; White; and Wooda & Copeland.

‡: ales reported as miscellaneous are retail sales which cannot be classified by state or as U.S. Government. They include sales and dispositions that do not go through usual marketing channels such as gifts to non-profit organizations, intra-plant or company transfers, etc.

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Ag mechanization: Shortage of workers, questions about wages

By Frank Buckingham

Survey of Illinois Farm Equipment Association members indicates a strong need—both now and in the future—for individuals trained in ag mechanization. But a U. of Illinois ag engineer has found that dealer personnel practices and low pay scales may be turning potential trainees away from ag mechanization.

■A MATTER of growing concern among some educators and employers of ag engineers is the increasing shortage of individuals trained in ag mechanization.

The number of ag engineers and graduates of the less technical ag mechanization curriculums of many universities, junior colleges, and technical schools isn't keeping pace with demand. And this shortage of individuals trained in ag mechanization was a major topic of discussion among engineers and employers attending the joint meeting of Canadian (CSAE) and American (ASAE) ag engineers last summer in Winnipeg.

A number of prospective employers attending the meeting indicated they were unable to find qualified individuals. And they expressed a need for persons to fill a wide range of positions in industry, as well as public service. They also noted that some jobs have been open for a year or more.

In addressing the shortage of ag mechanization graduates, and the problems in recruiting more students, Roland Espenschied, professor of ag engineering at the U. of Illinois, presented the results of a survey he made involving members of the Illinois Farm Equipment Assn. The group has about 500 dealer/members, and 146 survey responses were obtained.

The figures Espenschied reported, of course, cannot be extrapolated directly to other areas, but the problem of obtaining well-trained new employees is echoed around the country. The table shown on these pages indicates the number of employees needed to fill various dealership positions as indicated by those 146 responding Illinois dealers.

The responding dealers were (at the time of the survey) employing 188 graduates of technical training programs, which was projected to 648 such graduates for dealers statewide.

Not all the positions listed in the table, of course, can be filled with new technical school graduates. Nor can they be filled satisfactorily by simply hiring the best men away from the competing dealer across the road. Many of the management positions can, however, be filled by promotion from within the ranks of present employees.

More money, better help

Espenschied reported that current technical school enrollment trends are downward, and strong efforts are needed to recruit more students to fill the potential openings.

Espenschied blames much of this problem on present dealer personnel practices and pay scales. He illustrates his contention with reports from former students who first worked for implement dealers and then switched to automobile service departments when they learned that former classmates were earning 50, 75 or even 100 per cent more for doing essentially the same work on cars.

"As diesel cars become more common, farm equipment dealers will lose a lot more good mechanics because they presently have the largest pool of trained diesel service personnel available," Espenschied points out. "And most of them are being paid well below the level of auto mechanics."

One dealer Espenschied talked to was reportedly paying young mechanics $5.45 per hour. And the dealer said, "You should be able to get good help for that. Young men come in and want top money, but they're not worth it."

In many areas, unskilled, shovel-leaning construction workers and truck drivers are paid more than that. So, where's the incentive for a student to pay and take time for technical education?

"If a car dealer can justify mechanic's wages of $8-10 per hour or more for men servicing a farmer's $6,000-8,000 car, then in

(*Continued on page 34*)

Future Employee Needs, Illinois Farm Equipment Association

Position	Numbers needed by responding dealers				Proj. all Ill. dealers in 5 Years
	Presently Employed	Needed This Year	Needed in Two Years	Needed in Five Years	
Tractor/power technician	538	170	247	334	1,152
Machinery specialist and setup	394	99	190	209	721
Parts personnel	256	71	110	121	417
Sales	287	81	120	125	431
Bookkeeping	219	47	66	70	241
Management Personnel					
Service manager	127	30	38	40	138
Assembly and handling foreman	33	11	17	19	66
Parts manager	109	20	29	29	100
Sales manager	81	21	23	28	97
Office manager	82	15	21	25	86

Survey involving members of the Illinois Farm Equipment Association indicates the number of employees needed to fill various dealership positions. Responses were obtained from 146 Illinois dealers (out of about 500 dealer/members). The last column is the projected number needed five years from now, statewide, assuming the remaining dealers will be hiring at the same rate as those responding to the survey.

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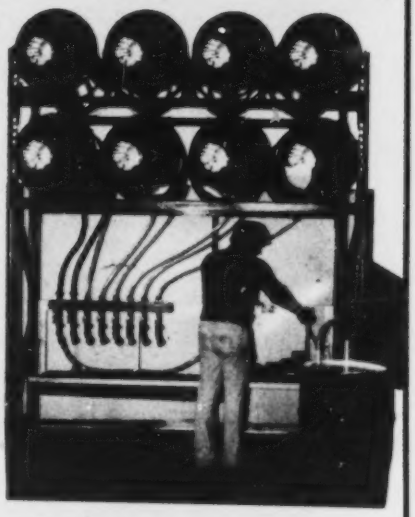

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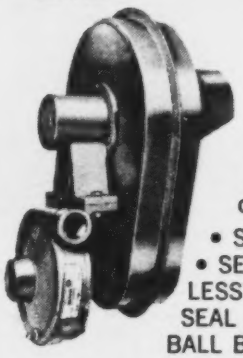

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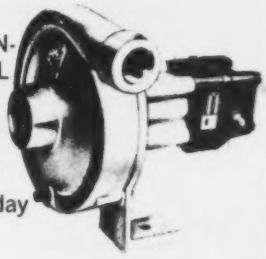

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Worker Shortage

(*Continued from page 14*)

the same town, a farm equipment dealer with any smarts at all should be able to justify equal pay for men servicing the same owner's tractors and combines that cost 10 times more than the car," Espenschied believes.

"Most of the responsibility for not being able to get and keep good help should be laid right back in the dealer's lap," he points out. "They must become better managers and learn to justify higher wages on the basis of better work performed by better-trained personnel. Until then, they can't expect much sympathy or better help."

Most technical schools, junior colleges, and universities are aggressively recruiting new students. But the farm equipment industry needs to assume a greater responsibility for determining the number and types of personnel needed in the near and foreseeable future.

The industry should actively assist schools in their recruiting programs by contacting potential students and publicizing opportunities within the industry. □

industry in motion

Massey-Ferguson has received the Merit Award for 1979 from the Soil Conservation Society of America. MF was cited for its sponsorship of the film, "We are of the Soil." It describes the history and effects of soil erosion, and ways to control it.

David Ragsdale is a new sales representative for **Shaver Mfg. Co.,** Graettinger, Iowa.

Mark IV Advertising, Peoria, Ill., has been named advertising agency for **Yetter Mfg. Co.,** Colchester, Ill., makers of tillage equipment and other farm equipment.

Mike Lynch has been named marketing and sales manager for **Preco, Inc.,** Los Angeles, Calif., producer of moldboard plows, box scrapers, backhoe buckets, ripper kits and other equipment.

Patricia M. Howe, a partner in the securities firm of L. F. Rothschild, Unterber, Towbin, has been elected to the board of directors of **Lear Siegler, Inc.**

Farmers rate big tractor fuel economy

By Frank Buckingham

Survey by the Professional Farmers of America (PFA) in early 1978 reveals that many big tractor owners are generally satisfied and/or unconcerned about the fuel economy of their tractors. The author wonders, however, whether farmers really know how much fuel consumption to expect from a given tractor.

■IN RECENT months fuel economy and conservation have been forcibly impressed on the minds of the American public. And regardless of the reasons, many farmers have become concerned about the fuel economy of their tractors.

In a Professional Farmers of America (PFA) big tractor survey conducted in early 1978, member/farmers were asked to rate the fuel economy of their tractors. They were also asked to indicate the gallons of fuel burned per hour at full load, and to comment on fuel economy. Responses, as might be expected, were mixed.

Keep in mind that when this PFA survey was made fuel prices were much lower than those that exist today.

Very few farmers are equipped or inclined to accurately measure fuel consumption on a per hour or per acre basis. That means most of their consumption figures should be considered estimates, and some are very questionable estimates.

Fuel consumption figures reported by PFA member/farmers were averaged for each tractor model (see chart). These averages were then compared with average fuel consumption in gallons per hour (gph) obtained during that portion of the Nebraska Tractor Tests involving "75 per cent of pull at maximum power." This Nebraska figure is often used by engineers and others for average fuel consumption under reasonably heavy loads.

All but four of the 28 big tractor models reported in the PFA survey had been tested at Nebraska. Fuel usage by those tractors at "75 per cent of pull at maximum power" had already been determined.

Comparing averages

Average fuel use reported in the PFA survey ranged from 62 to 109 per cent of fuel consumption reported in the Nebraska Tests of the same tractors. The lowest gph and consumption at Nebraska was for the Deutz 10006, and the high in both cases went to the Steiger Panther.

Averages may, however, be somewhat deceiving. About two-thirds of the PFA member/farmers responding to the survey provided some figure for gallons per hour used at full load. But because only limited numbers of some models were reported, an extremely high or low figure for a particular tractor might seriously affect the average for that model.

The average for 43 Allis-Chalmers 7060 tractors, for example, was 8.4 gph or about 95.5 per cent of the 8.8 gph reported in the Nebraska Test. The highest reported fuel use for the 7060, however, was 16 gph or 182 per cent of the Nebraska figure. The lowest reported fuel use was only 3.5 gph—slightly less than 40 per cent of the Nebraska comparison.

The maximum and minimum figures reported by PFA members for the Deutz 10006 tractor, however, were only 4.5 and 3.0 gph respectively. These figures represent only 83.3 and 55.6 per cent of the total consumption reported for that particular model in the Nebraska Tests.

It also appeared that some farmers must be pulling light loads with their big tractors, and thereby holding their gallons used per hour down. For example, the lowest fuel use reported for the Massey-Ferguson 1805 four-wheel-drive tractor was 3.0 gph—compared with 10.6 gph in the Nebraska Tractor Test of that model. The lowest reported figure for the International Harvester 1586 was also 3.0 gph, only 33.7 per cent of the hourly fuel used in the Nebraska Test.

On the other hand, some PFA members estimate extremely high fuel usage by their tractors—almost too high. One engine designer said he had calibrated fuel pumps in the laboratory prior to placing test tractors with farmers who were asked to record fuel consumption. Fuel output was again verified upon return of the tractors. And on several occasions, farmers reported more fuel used than the pumps were physically capable of pumping per hour.

Fuel economy ratings

In spite of the apparent ambiguity between reported fuel use and that used in the Nebraska Tractor Tests, a correlation of sorts was found. Tractor owners were asked to rate the fuel economy of their tractors as excellent, good, fair, or poor. These ratings were then assigned values of 4, 3, 2, and 1 respectively. Those values were then converted to a percentage of the possible score if all ratings had been excellent.

Such composite ratings were calculated by tractor model, manufacturer, and for all tractors reported in the PFA follow-up survey.

The ratings obtained for all tractors were then compared with figures obtained during the original PFA big tractor survey conducted in late 1975. The results of that first survey were presented in a series of I&T articles in 1976.

The new overall rating was found to be 4.1 points higher—78.7 versus

(More...)

Fuel Economy—Farmer Ratings, Nebraska Results

Tractor Make, Model	PFA Members: Farmers rate Fuel economy (1)	PFA Members: Ave. fuel use —heavy load (Gals/hr)	Nebraska Tractor Tests: Max. power available (Gals/hr)	Nebraska Tractor Tests: 75% of pull at max. power (Gals/hr)
Allis-Chalmers				
7000	E-5, G-16, F-3, P-1	5.5	6.8	6.1
7040	E-11, G-24, F-2, P-2	7.2	8.8	7.8
7060	E-12, G-27, F-12, P-1	8.4	10.0	8.8
7080	E-1, G-3 F-2	9.5	11.3	10.3
7580	E-4, G-6, F-1	9.6	12.6	11.2
J I Case (2)				
1570	E-3, G-11, F-2, P-1	9.4	11.6	9.8
2870	E-1, G-4	13.0	16.2	14.1
John Deere (3)				
4440	E-1, G-5	8.3	8.6	7.6
Deutz (4)				
10006	E-6	3.6	7.3	5.4
13006	E-9	5.6	7.3	6.4
Ford				
8700	E-2, G-2	4.1	7.8	6.6
9700	E-2, G-3, F-2	7.0	9.0	7.9
International Harvester				
986	E-3, G-12, F-2, P-1	6.2	7.1	6.4
1086	E-32, G-61, F-12, P-1	6.5	8.5	7.4
1486	E-8, G-29, F-2, P-1	7.5	9.5	8.4
1586	E-13, G-25, F-11, P-1	7.9	10.5	8.9
4386	E-1, G-6	10.3	13.6	11.4
4586	E-3, G-1, F-1	10.3	17.7	15.7
Massey-Ferguson				
1505	E-2, G-3	8.3	12.0	10.3
1805	E-3, G-17, F-2	8.9	12.8	10.6
Steiger				
Cougar 250/251	E-4, G-4	10.9	15.9/13.5(5)	14.1/11.8
Cougar 270	G-6, F-3, P-1	12.9	16.6/16.4(6)	14.6/14.3
Panther 320/325	E-6, G-9	13.4	18.2	15.9
Versatile				
750	E-3, G-1	8.4	NA(7)	NA
800	E-7, G-3	8.6	NA	NA
850	E-13, G-7, F-1, P-1	11.1	NA	NA
White				
2-155	E-2, G-5	7.8	10.4	9.2
4-180	E-11, G-7, F-1	8.8	12.8	10.6

(1) E—Excellent, G—Good, F—Fair, P—Poor

(2) Since the PFA survey was taken in early 1978, the J I Case Company has replaced Models 1570 and 2870 with Models 2590 and 4890, respectively.

(3) Because this survey was taken in early 1978 and because the John Deere 40 Series tractors had only been on the market for a short time (since late 1977), their representation in this particular survey is quite low. Deere units dominated the earlier PFA survey of big tractors.

(4) Deutz Models 10006 and 13006 (introduced in the U.S. in 1971 and 1972 respectively) are no longer produced. They have been replaced by the Deutz DX Series tractors.

(5) Numbers to the left of the slash mark represent the gallons of fuel used per hour by the Steiger Cougar III ST-250 Diesel during designated tests of drawbar performance in the Nebraska Tractor Tests. Numbers to the right of the slash represent gallons of fuel used per hour (during the Nebraska Tests) by the Steiger Cougar III ST-251 Diesel.

(6) Numbers to the left of this slash mark represent gallons of fuel used per hour by the Steiger Cougar III PT-270 Diesel and the Steiger Cougar III PT-270 without PTO during the designated Nebraska Tests. Numbers to the right indicate the average amount of fuel used by the Steiger Cougar III ST-270 Diesel in those same tests.

(7) NA means not available. These Versatile tractors have not been tested in Nebraska.

"Didn't buy my tractor for fuel economy."

74.6. This was one of the few areas in which ratings of various tractor features in the follow-up survey exceeded those from the first survey.

Four tractor lines had higher ratings in the follow-up than they received in the first survey, and five had lower scores the second time. The 10th line in the follow-up, Deutz, was not represented in the first survey, but received a perfect score in the follow-up. Fuel economy ratings for all Deutz 10006 and 13006 tractors were "excellent."

It should be pointed out, however, that the Deutz Model 10006 and 13006 tractors are no longer produced. Since the 1978 PFA survey was taken, Deutz has introduced its DX Series of high-horsepower tractors, succeeding the 10006 and 13006.

J.I. Case has also introduced its 90 Series tractors since this PFA survey was taken. The Model 2870 listed in the survey, for example, has been replaced this year by the Case Model 4890 tractor. And Model 1570 was replaced in 1978 by the Case Model 2590.

At the other end of the scale, tractor lines with the lowest user ratings for fuel economy also had fuel consumption averages closest to the amounts obtained in the Nebraska Tractor Tests.

This relationship, however, between reported fuel use and consumption in the Nebraska Tests did not follow through consistently for all tractor lines, and was not particularly apparent for individual models. Higher user ratings were generally given to tractor models with lower average fuel consumption.

"My big tractor uses less fuel to plow than smaller tractors."

Most PFA members (at the time of the follow-up survey) appeared satisfied with or even totally unconcerned about the fuel economy of their tractors. Favorable and neutral comments on fuel economy outnumbered complaints by more than four to one.

Numerous owners remarked that fuel consumption was quite good for the amount of work done. Some commented, "Uses a lot but does a lot." "Less fuel to plow than smaller tractors," and "Real good on light loads."

Other owners disregarded the entire matter with such remarks as, "Didn't buy it for fuel economy."

Some owners upset

Many owners were concerned, and a few seemed very upset about the amount of fuel used by their big tractors. One griped, "Excessive fuel consumption—it's the tankwagon man's best friend—sometimes only gets four hours of operation on a tankful."

Another owner of the same model, plus a larger one in the same line, complained that the larger tractor burns more fuel than the smaller one when both are pulling the same size plow.

Some owners indicated that fuel consumption varied with the load. One said it fell from 7.5 gph with a heavy load to 2.5 gph on light loads.

Several other users complained, however, that too much fuel was used on light loads. Part of this, of course, might be attributed to use of very big tractors for small jobs. Air conditioner use would also increase fuel consumption.

How much is too much?

The level of maintenance, loads pulled, and the operating habits of the tractor operator may also affect the amount of fuel consumed by a given tractor, just as personal expectations of the owner can affect his satisfaction with the amount used.

The amount of fuel said to be used per hour at full load by a tractor seems to have little bearing on the owner's rating of fuel economy as excellent, good, fair, or poor. As a case in point, for one four-wheel-drive tractor with 235 drawbar hp, fuel use of 9.0 gph was rated "good" with the comment that "it could be better."

Fuel use of 13 gph by the same tractor was rated "fair" and 16 gph was rated "excellent."

Another owner rated 18 gph as "excellent" for his four-wheel-drive tractor, although that's two gph more than that tractor used in the Nebraska Tractor Tests.

The incongruity of reported fuel use and owner ratings of fuel economy may imply two things. First, the owners don't know how much fuel is really being used per hour or per acre, and as long as it seems reasonable they aren't going to complain. Secondly, they don't really know what fuel consumption they should expect from a given tractor.

Are tractor buyers really being informed as to the amount of fuel they can reasonably expect a certain tractor to burn per hour under full load, under partial load?

Farmers, of course, discuss fuel use with neighbors and friends using similar tractors. But seemingly minor differences are often discounted as being due to soil conditions, implement working depth, or some other reason.

How many stop to realize that there's a 20 per cent difference in fuel use between two tractors using eight and 10 gph to do the same work?

Proper interpretation of the results of Nebraska Tractor Tests can provide guidelines to anticipated fuel consumption, as well as power output. Sharing this information with all prospective tractor buyers will better enable them to know when fuel consumption is within reasonable bounds and approximately what rate of fuel use they can expect.

Continued limitation of fuel supplies and higher prices, which appear inevitable, will increase the demands for accurate fuel economy figures for all power equipment. □

RETAIL SALES OF SELECTED FARM EQUIPMENT—Jan.-July, 1978 and 1979 (1)

(In Units)

	Combines Self-Propelled		Corn Heads		Hay Balers (2)		Windrowers Self-Propelled Power Units		Windrowers Self-Propelled Total Heads		Grinder-Mixers		Shear-Bar Forage Harvesters (3)	
	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979
Alabama	12	119	30	32	280	147	1	....	1	....	109	148	30	25
Arizona	35	18	5	....	20	24	40	40	43	43	6	4	5	8
Arkansas	295	208	1	1	414	300	1	2	1	1	43	41	6	12
California	121	108	20	21	151	128	208	156	227	176	3	11	30	31
Colorado	137	172	25	38	263	274	153	175	160	178	26	49	38	36
Connecticut	....	1	....	....	46	44	....	....	....	....	1	2	8	14
Delaware	10	13	4	9	27	11	3	....	3	....	2	8	7	4
Florida	62	42	32	34	77	56	....	1	....	1	25	45	17	8
Georgia	284	241	179	169	263	160	4	1	4	1	256	339	61	49
Idaho	133	135	3	4	293	296	176	221	186	222	11	25	29	19
Illinois	1,196	1,194	957	873	304	278	26	11	26	11	425	463	136	148
Indiana	739	683	632	543	347	291	6	7	5	7	337	426	90	96
Iowa	945	1,105	832	798	350	300	194	188	196	190	983	1,516	379	376
Kansas	982	1,118	86	80	326	345	252	282	259	290	163	245	76	103
Kentucky	172	177	116	85	538	345	3	3	3	4	199	232	78	62
Louisiana	196	169	2	....	109	87	....	....	....	....	11	12	13	8
Maine	1	1	....	....	51	63	....	3	....	3	....	1	18	23
Maryland	43	45	45	32	118	88	8	6	8	6	31	34	26	34
Massachusetts	....	....	....	....	44	30	1	1	1	....	3	1	6	10
Michigan	231	208	174	124	405	271	48	49	48	51	161	181	143	206
Minnesota	725	669	387	437	748	620	558	444	573	454	374	682	419	488
Mississippi	186	199	7	3	160	102	....	....	....	....	42	36	25	29
Missouri	382	461	161	173	625	497	71	65	73	65	294	477	62	90
Montana	182	138	....	2	286	251	352	307	381	317	32	55	24	17
Nebraska	625	562	338	282	184	172	342	359	357	370	255	457	137	148
Nevada	1	....	....	....	32	29	43	48	46	51	1	1	3	2
New Hampshire	....	....	....	....	33	29	1	....	1	....	....	2	9	8
New Jersey	19	17	10	6	55	46	2	....	2	....	10	11	12	6
New Mexico	11	13	6	....	119	89	68	64	66	64	10	17	3	3
New York	47	43	54	50	492	477	40	42	42	42	124	83	272	288
North Carolina	109	177	94	97	429	240	2	3	2	3	127	166	36	31
North Dakota	521	517	7	10	105	59	611	529	643	553	62	141	47	40
Ohio	572	605	429	421	659	473	9	10	8	10	328	384	113	114
Oklahoma	314	372	2	2	595	647	115	125	118	128	68	111	19	28
Oregon	124	88	2	....	258	215	203	149	213	150	11	26	46	41
Pennsylvania	80	111	70	68	766	652	57	56	58	55	195	237	217	248
Rhode Island	....	....	....	....	3	3	....	....	....	....	....	1	....	....
South Carolina	99	115	45	42	133	68	....	....	....	....	54	30	18	16
South Dakota	355	225	106	91	192	106	569	551	603	589	176	274	127	127
Tennessee	137	193	43	40	672	475	2	....	2	....	135	187	87	73
Texas	538	535	123	117	909	994	73	81	80	90	114	179	21	41
Utah	23	17	....	....	207	200	101	87	100	88	25	55	38	28
Vermont	....	....	1	....	77	77	....	....	....	....	1	2	45	54
Virginia	69	80	49	62	469	379	7	5	7	5	91	112	76	58
Washington	182	196	5	25	240	187	122	133	122	138	14	15	62	52
West Virginia	2	2	1	3	298	199	....	....	....	....	18	20	17	12
Wisconsin	121	99	144	111	1,287	1,257	205	259	205	262	315	456	924	1,061
Wyoming	20	23	4	2	133	131	97	97	102	103	14	19	9	10
Alaska	....	....	....	....	2	3	....	....	....	....	....	....	....	....
Hawaii	....	....	....	....	....	....	....	....	....	....	2	....	....	....
U.S. Government	....	1	....	....	....	....	....	....	....	....	....	....	....	....
Miscellaneous (4)	1	....	....	....	....	....	....	....	....	....	....	6	....	....
TOTAL	**11,153**	**11,215**	**5,231**	**4,887**	**14,594**	**12,215**	**4,774**	**4,580**	**4,975**	**4,721**	**5,687**	**8,073**	**4,064**	**4,385**

Data released September 1, 1979, Farm & Industrial Equipment Institute.

(1) Includes revisions for prior months.
(2) For making bales of under 200 lbs.
(3) Pull-type, mounted, self-propelled.
(4) Sales reported as miscellaneous are retail sales which cannot be classified by state or as U.S. Government. They include sales and dispositions that do not go through usual marketing channels such as gifts to non-profit organizations, intra-plant or company transfers, etc.

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

JONES FARM EQUIPMENT CO. Dothan, Alabama (September 11, 1979)

ALLIS-CHALMERS TRACTORS
XT190, LP, high profile, 1967, (Fair) 2100
185 diesel, 1975 (Good) 6300
175 diesel, 1970 (Fair) 4000*
D21 diesel, 1967 (Good) 3500*
D17 diesel, 1965 (Good) 3400*

CASE TRACTORS
1370 diesel, cab, 1974 (Good) 6300*
830 diesel, 1965 (Good) 2350*
VAC, 1949 (Fair) 250

DEUTZ TRACTORS
9006 diesel, 1972 (Fair) 3600*
4005 diesel, (Fair) 1125*

DAVID BROWN TRACTORS
880 diesel, 1965 (Fair) 500
880 diesel, 1965 (Rough) 350
880 diesel, 1965 (Fair) 480

MASSEY-FERGUSON TRACTORS
1105 diesel, 1973 (Good) 7700*
1080 diesel, 1972 (Fair) 4300*
230 diesel, 1976 (Good) 3850
180 diesel, 1968 (Good) 3825*
180 diesel, 1967 (Fair) 2300
180 diesel, 1967 (Good) 3800
175 diesel, 1971 (Fair) 3250
175 diesel, 1967 (Good) 3700
165 diesel, 1970 (Fair) 2600*
2135 diesel, 1968 (Fair) 1475
135 diesel, 1973 (Excellent) 3900*
135 diesel, 1967 (Fair) 2550*
35 diesel, 1963 (Good) 2250
35 diesel, 1962 (Good) 2000*
35 diesel, 1961 (Fair) 1225*
35 diesel, 1961 (Good) 2150
35, 1955 (Fair) 1175*
35, 1955 (Fair) 1700
40, ldr., 1970 (Fair) 2750
TO20, 1950 (Fair) 650
TO20, 1950 (Fair) 675

FORD-FERGUSON TRACTORS
9N, 1944 (Good) 975

FORD TRACTORS
8000 diesel, 1969 (Good) 5450*
8000 diesel, cab, duals, 1969 (Fair) 5300*
5550 diesel, ldr., backhoe, 1971 (Good) 7750*
4000 diesel, corn picker, 1963 (Fair) 1600*
4000, Select-O-Speed, 1963 (Fair) 750*
3400 diesel, 1966 (Fair) 2300*
3400 diesel, 1966 (Good) 2850
3400 diesel, ldr., backhoe, 1966 (Excellent) 5500*
3000 diesel, 1967 (Fair) 2950
3000 diesel, 1966 (Good) 3400*
3000, 1966 (Good) 2900*
2000 diesel, 1966 (Good) 2650*
2000, 1963 (Fair) 2200
2000, 1963 (Fair) 1900*
941, corn picker, 1958 (Good) 1700
871, Select-O-Speed, 1958 (Good) 1300*
861 diesel, 1958 (Rough) 500
861 diesel, 1958 (Fair) 1350
860, 1955 (Fair) 1550
850, 1955 (Good) 2100
850, 1955 (Good) 1900*
841, 1959 (Fair) 1175*
841, 1958 (Good) 2050*
740, 1955 (Fair) 975
740, 1955 (Rough) 400
641, 1959 (Good) 1900*
641, 1958 (Good) 2000
640, 1955 (Fair) 1475*
640, 1955 (Good) 1900
621, 1960 (Good) 1950*
Sup. Maj. diesel, 1962 (Fair) 550
Sup. Dexta, 1962 (Fair) 800*
Sup. Dexta, 1962 (Good) 1100*
Dexta, 1959 (Fair) 925
Jub., 1953 (Good) 1550
Jub., 1953 (Fair) 1400
Jub., 1953 (Good) 1700*
8N, 1951 (Good) 1275
8N, 1951 (Good) 1250
8N, 1950 (Good) 1225
8N, 1950 (Good) 1300
8N, 1949 (Fair) 1075*
8N, 1949 (Fair) 1050

INTERNATIONAL HARVESTER TRACTORS
1468 diesel, cab, 1972 (Excellent) 8000*
1256 diesel, 1968 (Fair) 5000*
706 diesel, duals, 1965 (Fair) 2700*
664 diesel, 1972 (Good) 4950*
574 diesel, 1972 (Fair) 3100
574 diesel, 1972 (Fair) 2600*
460 diesel, 1959 (Fair) 750
444 diesel, 1970 (Fair) 1550
444 diesel, 1967 (Good) 1800*
B414 diesel, 1962 (Good) 1400
B414 diesel, ldr., 1962 (Fair) 950
404, 1967 (Good) 1525
404, 1964 (Fair) 1050*
404, 1961 (Fair) 1300*
354, ldr., 1973 (Good) 3300
300, 1955 (Rough) 150
M, duals, 1950 (Good) 725*
Sup. H, corn picker, 1953 (Fair) 300*
H, 1946 (Good) 375*

(*More...*)

Auger Up Bigger Profits with KOYKER Super Augers

SUPER 105 Big . . . high-capacity industrial type auger for the farm. Has new 10" Super-Rib tube with special design that gives more space for large volume grain moving. Handles up to 6250 bu. per hour. Bottom-end drive enclosed in oil bath for minimum maintenance . . . long life. Super-105 is extendable from 52' to 72'. This bonus reach and height will allow your customers to reach most farm bins.

SUPER 85 Built for hard work, Super-85 has unique Super-Rib auger tube with effective diameter of 8½ inches . . . larger than any 8" auger on the market. Can handle up to 3500 bu. per hour. Powerful lower-end drive completely enclosed in oil. Super-85 available in 8 lengths from 33' to 68'. Heavy trussed-girder undercarriage engineered from high tensile steel tubing. Complete accessories available including Swing-A-Way hopper.

KOYKER

SUPER-75B Rugged, powerful 7½" Super-75B moves as much grain as most 8" augers with only half the wear! Special screw turns about half the RPM's of most 6" augers. This means less maintenance . . . longer life. The economical Super-75B is extendable to meet your customers' future needs. Available in 8 lengths from 26' to 61'. Complete accessories: Safety Relief Gate, Swing-A-Way, Tilting or Triangle Hoppers; Cleaning Sections; Choice of Drives; Other Options.

SUPER-60 The inexpensive 6" price-conscious auger designed with same high-quality precision parts found only on larger 7½" augers. Will handle straight grain moving jobs that do not require specialized features. Available in 32', 42' and 47' lengths. PTO, Electric or Gas Drives.

Your sales and profits depend on supplying your customer with the exact auger he needs. Koyker Super Augers are packed with all the high-performance, fast-selling features that can make the Koyker line your top profit line. Write today for information and discounts.

WRITE Dept. K-26-102

KOYKER MANUFACTURING COMPANY

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140, cult., 1959 (Good) 1600*
Cub Loboy, mo., 1968 (Good) 1800*
Cub Loboy, mo., 1963 (Good) 2000
Cub Loboy, mo., 1962 (Fair) ...1300
Cub, plow, 1948 (Fair) 550

JOHN DEERE TRACTORS
7020 diesel, cab, duals, 1973 (Good) 8000*
4020 diesel, 1965 (Fair).....3000
4010, 1962 (Good) 2950*
2010, 1962 (Fair).....900*
1010, 1967 (Fair).....1150*
310 diesel, ldr., backhoe, 1975 (Excellent) 9100

LEYLAND TRACTORS
384 diesel, 1971 (Fair).....1750
344 diesel, 1971 (Good) 2750

MINNEAPOLIS-MOLINE TRACTORS
670 diesel, 1965 (Fair).....1550*
670 diesel, 1965 (Fair).....1600*
500, backhoe, 1965 (Fair).....1900

OLIVER TRACTOR
1250 diesel, 1966 (Good) 1850*

SATOH TRACTOR
Stallion diesel, (Excellent).....4700

HEFTY TRACTOR
F, (Good).....1900*

VERSATILE TRACTOR
145 diesel, (Fair) 3900

YODER & FREY, INC.
Archbold, Ohio
(September 11, 1979)

ALLIS-CHALMERS TRACTORS
XT190, 1966 (Rough).....3800*
D15, 1961 (Rough).....1650
D15, ldr., (Rough) 920
WD, plow, 1959 (Fair).....975
WC, 1947 (Fair) 450
C, (Rough).....280
G, (Fair).....500

CASE TRACTORS
1170 diesel, 1971 (Good) 8000*
830, 1968 (Good) 2300
800, plow, 1959 (Fair) 1000
830, 1962 (Rough) 600*
530, ldr., 1968 (Good).....3400*
430, ldr., 1963 (Fair) 2500

DAVID BROWN TRACTORS
1200 diesel, 1970 (Fair).....3200*
1200 diesel, (Rough).....1350*
885 diesel, (Good).....3700*

JOHN DEERE TRACTORS
4430 diesel, 1974 (Excellent) 16,100*
4320 diesel, 1971 (Good).....10,800*
4020 diesel, 1968 (Good) 7500*
4020, 1967 (Good) 4450
2510, 1966 (Good) 3625
2010, 1962 (Fair).....2100
2010 diesel, 1961 (Rough) 1550
730 diesel, 1960 (Fair).....2600*
730 diesel, 1959 (Good) 2450
730 diesel, 1959 (Fair).....2200
720 diesel, 1957 (Good) 2000
720 diesel, 1957 (Fair).....1725*
420, 1957 (Good) 1800
320, 1968 (Good) 4800
70 diesel, 1952 (Fair).....1250*
60, 1954 (Good) 1025*
60, 1954 (Fair).....700
60, 1954 (Fair).....650
40, 1954 (Rough) 775
G, 1946 (Fair) 450
A, 1947 (Fair) 510*
B, 1946 (Rough) 375*

DEUTZ TRACTOR
6006, 1972 (Fair).....3700*

FORD TRACTORS
9600 diesel, 1975 (Excellent) 11,900*
9000, 1971 (Good) 8650
5000, 1971 (Good) 5275*
5000, 1971 (Good) 5100*
5000, 1965 (Fair).....3500*
5000, ...2200
4000, 1977 (Excellent).....5000*
4000 diesel, (Fair) 2700
4000, 1967 (Fair).....2550*
4000, 1967 (Rough) 1975
4000, 1965 (Good) 2950
4000, 1965 (Fair).....1950*
2600, (New).....5100*
1600, mo., (New) 4250
860, 1958 (Rough) 1650
860, 1957 (Fair).....1500*
741, ldr., 1958 (Good).....2050*
600, 1956 (Fair).....1525*
2000 Dexta, 1965 (Good).....2025
Maj. diesel,.....1500
Jub., ldr., 1953 (Good) 2100*
Jub., ldr., 1953 (Fair) 2000*
Jub., 1953 (Fair).....1500*
Jub., 1953 (Fair).....1400
Jub., 1953 (Rough) 950
8N, ldr., 1952 (Good) 1800
8N, 1952 (Fair) 1275*
8N, 1952 (Fair) 1150*
8N, 1952 (Fair) 1000
8N, 1951 (Good).....1375
8N, 1950 (Fair) 1150
8N, 1950 (Fair) 1000*
8N, 1950 (Fair) 925*
8N, 1949 (Fair) 1250
8N, 1949 (Fair) 1100
8N, 1949 (Fair) 1000*
8N, 1948 (Fair) 1025
8N, 1946 (Fair) 900*
9N, ...1025
9N, 1945 (Fair) 775*

COFER

Heavy Duty Tractor Splitting Stands and Tire Carts

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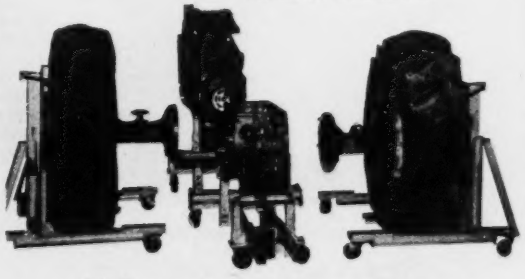

- 60 Day satisfaction guarantee
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- Heavy 6" castors for easy roll

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A.I.M. REPS ASSOCIATION

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Monday, November 12, 1979
9:00 - 12:00 Noon
Hotel Toronto - Toronto, Canada
Directory & Info on Request

Agricultural & Industrial Manufacturers Representatives Association
P.O. Box 1311
Mission, KS 66222 **913/262-4511**

Circle (29) on Reply Card

9N, 1945 (Fair) 800

INTERNATIONAL HARVESTER TRACTORS

1066 diesel, 1975 (Excellent) 10,400*
706, 1963 (Good) 3300
700, 1954 (Fair) 1200
624, ldr., 1968 (Fair) 2700*
560, 1961 (Fair) 2275
560 diesel, 1959 (Good) 2350
460, 1955 (Good) 1650
460 diesel, 1955 (Good) 1550
450, 1955 (Good) 1250
434, 1965 (Rough) 1600*
400, 1955 (Fair) 950*
350, 1955 (Rough) 910
340, 1960 (Fair) 1300*
300, 1954 (Fair) 900
M, 1951 (Good) 1400
M, 1950 (Good) 825
M, 1950 (Fair) 635
M, 1949 (Fair) 750
M, 1948 (Good) 650
M, ... 750
M, (Rough) 450
Sup. H, 1950 (Good) 810
140, cult., 1968 (Fair) 2200*
A, cult., 1948 (Good) 600
A, (Rough) 270

MASSEY-FERGUSON TRACTORS

3165, 1969 (Fair) 2600*
1150 diesel, 1971 (Good) 6500*
1100 diesel, 1971 (Good) 5700*
165, 1970 (Good) 3600
165, 1970 (Good) 3575
165, 1970 (Good) 3200*
165, 1970 (Fair) 2775
165, 1969 (Good) 3800*
165, 1969 (Good) 3375
135, 1967 (Good) 3225*
135 diesel, ldr., 1966 (Rough) 2800
85, 1963 (Good) 1760
65, ldr., 1963 (Good) 2650
65, 1963 (Good) 2100*
65, 1963 (Fair) 1685
65, 1960 (Good) 1800
50, 1961 (Fair) 1800
50, ldr., 1958, (Fair) 1875
50, 1957 (Rough) 1350
35, 1962 (Good) 2500

MINNEAPOLIS-MOLINE TRACTOR

602, 1963 (Rough) 1800*

MASSEY-HARRIS TRACTORS

33, ... 400
30, ... 420
30, ... 275

OLIVER TRACTORS

2050 diesel, 1969 (Fair) 5400*
1950 diesel, turbo, 1969 (Good) 6900*
1950 diesel, turbo, 1967 (Good) 4350*
1600, 1963 (Fair) 2600*
88, 1954 (Rough) 475
88, (Rough) 400*
Sup. 55, 1957 (Rough) 1425

WHITE TRACTOR

4-150, 4-W-D, 1975 (Excellent) 13,600

NOTES
Prices reported are for individual sales at wholesale on "as is," "cash and carry" basis.
Prices reported are NOT averages.

Condition classifications: EXCELLENT means—Engine: in perfect condition, 400 to 600 hours of use; Rubber: 80% tread remaining, no breaks or cracks; Paint: original and bright; General Appearance: excellent.

GOOD means—Engine: good running condition; Rubber: 70% tread remaining, no breaks or cracks; Paint: original paint or a good repaint job; General Appearance: good over-all.

FAIR means—Engine: possibly in need of a minor overhaul to restore; Rubber: 60% tread remaining, some cracking evident in side walls; Paint: only fair, weathered and some rust apparent; General Appearance: worn, some dents, minor parts such as gage covers missing or broken.

ROUGH means—Engine: obviously in need of a major overhaul; Rubber: smooth; Paint: scarred, weathered, rusty, needs painting urgently; General Appearance: dents, ruptures, broken parts, loose wires, some components such as lights broken, missing or inoperative.

DEMONSTRATOR means—used for demonstrating only and in practically new condition.

Puts It All Together... Performance And Profits!

M-C dealers offer quality drying equipment with energy saving features that make sense for today's needs and for years to come.

CONTINUOUS FLOW DRYERS
Drying capacities up to 3000 Bu./Hr.

AUTOMATIC BATCH DRYERS
Dry 3 ways...Saves time...Loads and unloads evenly.

BIN FANS AND HEATERS
Faster drying at high static pressures...Energy efficient LP, NG or Electric heaters.

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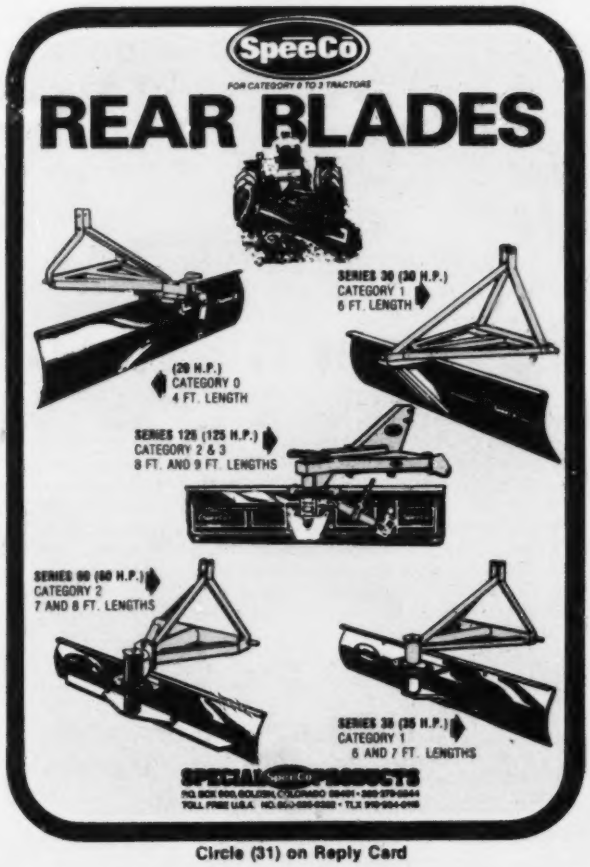

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